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EMU and asymmetries in monetary policy transmission

by

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Abstract

The decision to launch EMU has focused attention on possible asymmetries in output and prices responses to the single monetary policy across EU countries. Unfortunately, the numerous attempts to establish the extent of such asymmetries in the context of empirical macroeconomic models have not provided a consistent and robust picture of cross-country differences in monetary transmission and they are affected by methodological problems. This state of affairs has revamped interest in microeconomic studies comparing economic and financial structures across countries, as these are ultimately responsible for any differences in the way monetary impulses are transmitted throughout the economy.

This study takes stock of the insights and the empirical evidence from this latter strand of research, and discusses the possible evolution of economic and financial structures in EMU. The main aim of the study is to shed some light on how each channel of transmission may work differently in different countries and how this is being changed by the introduction of the euro.

The analysis indicates that the structural differences across the six euro area countries considered (Belgium, Germany, Spain, France, Italy, the Netherlands) are of a lesser scale than those between them and the UK or Sweden. Although this does not reveal in which group of countries monetary policy will have an overall stronger impact on output, it suggests that the mechanisms at work probably differ between the two groups.

Looking ahead, it seems likely that asymmetries in monetary transmission within the euro area could reduce over time as financial structures become more similar and economic agents adjust their behaviour to the new policy environment. In spite of the completion of the Single Market and the introduction of the euro, however, countries will continue to differ along many important dimensions - including, for instance, production structures, housing markets, labour markets, legal systems – implying that a degree of heterogeneity in monetary transmission will be a persistent feature of the euro area.

EMU AND ASYMMETRIES IN MONETARY POLICY TRANSMISSION

Massimo Suardi *

1. Introduction[1]

The decision to launch EMU has prompted a large literature examining potential differences in prices and output responses to monetary policy across EU countries. Establishing the extent of such differences is important because with heterogeneous cross-country responses the single monetary policy itself could induce idiosyncratic business cycles across euro area countries. Moreover, asymmetries in monetary transmission are likely to be more pronounced during the early years of the euro, when the potential for convergence in economic and financial structures is still to a large extent unrealised and economic agents have not yet fully adapted their behaviour to the new policy regime. It is sometimes objected that regional differences in monetary transmission in other large monetary unions, such as the US or large EU economies, have not attracted much attention in the past. However, the case of the euro area is fundamentally different from these examples, in that the former is not a single political entity but a union of independent countries which retain responsibility for non-monetary economic policies.

The recent empirical literature on asymmetries in monetary transmission can be broadly classified into two main strands, according to their respective focus on the macro- or the micro-economic level. A number of macroeconomic studies have tried to determine the extent of asymmetries in monetary transmission using a variety of econometric models and techniques. Unfortunately, so far these studies have failed to provide a consistent and robust picture of cross-country differences and they are riddled with methodological problems (Kieler and Saarenheimo, 1998; Guiso *et al.*, 1999). More recently, this state of affairs has revamped interest in microeconomic studies which focus on the role of economic and

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1 I benefited from the comments of several colleagues, including Oliver Dieckmann, Mads Kieler, Jürgen Kröger, Moises Orellana, as well as from the comments of the participants to the Workshop on "The Functioning of EMU: the Challenges of the Early Years", held in Brussels on 21-22 March 2001 and organised by the same Directorate General. Any remaining errors are mine. The views expressed in this paper are personal and should not be attributed to the European Commission.

financial structures in monetary transmission. Often these studies have concentrated on a single country or on a particular paradigm of transmission, although some works are of a more comprehensive nature.

This study takes stock of the insights and the empirical evidence from this latter strand of research, and discusses the possible evolution of economic and financial structures in EMU. As in most of the literature, the focus is on asymmetries in the response of output to monetary policy. The issues related to applying a single monetary policy to countries at different stages in the business cycle are beyond the scope of this paper.

The analysis is structured around the standard taxonomy of transmission channels: the interest rate, the exchange rate and credit. The credit channel is treated separately although it should be seen as "… a set of factors that amplify and propagate conventional interest rate effects" rather than as a transmission channel in itself (Bernanke and Gertler, 1995)[2]. Table 1 summarises the theoretical framework. Sections 2 and 3 present cross-country data on the variables which monetary theory suggests to be relevant for monetary transmission. The eight countries considered are: Belgium, Germany, Spain, France, Italy, the Netherlands, Sweden and the United Kingdom, i.e. six euro area countries plus two potential future participants in the euro.

The main aim of the study is to shed some light on how each channel of transmission may work differently in different countries and how this is being changed by the introduction of the euro. On the other hand, the essentially descriptive analysis of economic and financial structures in Sections 2 and 3 is not suited to rank countries according to the overall effect of monetary policy. This is because different aggregate output and inflation responses to monetary policy can arise because companies and individuals behave differently in each country and/or because the mix of these agents differ across countries. Clearly, Sections 2 and 3 only deal with the latter aspect. Section 4 concludes.

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2 Economists maintain widely divergent opinions concerning the mechanisms, the timing and the strength with which monetary policy affects inflation and output (Mishkin, 1995, and articles therein). In the case of the euro area, the uncertainty is compounded by the fact that this is a new economic entity, with still partly unsatisfactory aggregate statistics and in which the regime change implied by the introduction of the euro may have invalidated previous empirical relationships. The higher uncertainty faced by the ECB is put forward as an important rationale for its eclectic and flexible monetary policy strategy (ECB, 2000 and 2001).

Table 1: Main determinants of the transmission of monetary policy to output	
Interest rate channel	
Interest rate pass-through	A quicker and fuller pass-through from policy interest rates to market and bank lending rates increases the power of transmission.
Interest sensitivity of production	A higher share of interest-sensitive sectors in GDP strengthens the effect of monetary policy.
Price and wage rigidity	The more nominal price and wages are rigid, the larger the impact of any given demand fall on output. Real rigidities magnify the effect of nominal rigidities.
Income effect	The impact of higher interest rate on disposable income depends on households' debt position, the maturity of their interest-bearing assets and liabilities, as well as the pass-through from policy interest rates to average interest rates.
Wealth effect	The wealth effect on consumption will be stronger in countries where households' wealth is large and held in the form of assets with volatile prices. Given the weight of real assets in total wealth, the size and speed of the response of real estate prices to interest rate changes is also crucial.
Exchange rate channel	
Openness to trade	More open economies experience a stronger reduction in output from a real exchange rate appreciation. In these economies, however, the exchange rate will also have a comparatively larger impact on prices (a positive terms of trade effect), and exports may have a higher import content.
Credit view: Bank lending channel	
Impact of monetary policy on loan supply	A monetary policy tightening may reduce loan supply, especially if bank health is poor. However, banks which have large holdings of securities and/or can acquire loanable funds (e.g. by issuing market securities) can keep their loan supply unchanged.
Degree of bank dependence	A high share of bank loans in business financing and a large number of small firms (which have less alternative sources of finance) would point to a potentially strong bank lending channel.
Credit view: Balance-sheet channel	
Size structure of firms	Smaller firms, more prone to suffer from information asymmetries, are likely to experience a larger increase in the external finance premium (the difference in the cost of external versus internal finance).
Use of collateral	A monetary tightening that reduces the value of collateral will have a stronger effect where collateral is more extensively used.
Firms' leverage	Firms in financial distress (e.g. measured by a high ratio of interest payments over operating income), are more likely to suffer from the negative cash-flow impact of higher interest rates. A high leverage ratio may be an indicator of financial distress. On the other hand, it may also suggest ease of financing.
Efficiency of legal system and contract enforcement	Credit rationing is more likely in countries with inefficient legal systems and weak enforcement of contracts. In such cases, a low level of outstanding credit would suggest liquidity constraints.

2. Interest rate and exchange rate channels

With sticky prices, an increase in nominal interest rates causes a rise in the real interest rate. The resulting increase in the cost of capital reduces investment spending (fixed and inventory) and households expenditure on housing and durable goods[3]. If the interest rate rise causes an appreciation in the real exchange rate, net exports fall. Higher interest rates also affect consumption by (i) changing the disposable income of lenders and borrowers and (ii) lowering households wealth (assuming that the prices of real and financial asset are negatively related to interest rates). The breakdown of these negative demand impulses into prices and output responses depends on the slope of the short-term and long-term aggregate supply curve, in turn a function of price and wage-setting mechanisms[4].

The main elements shaping the interest rate channel are likely to be (Table 1): the transmission of changes in policy interest rates to market and bank lending interest rates; the structure of production; the degree of wage and price flexibility, which is determined by the working of goods and labour markets; sectoral balance-sheets, which delimit the scope for income and wealth effects; housing market institutions, which influence the response of house price respond to changes in interest rates. For the exchange rate channel, the key indicator is the degree of extra-euro area openness. The remainder of this section discusses the extent and consequences of differences along these dimensions across eight EU countries.

2.1 Interest rate pass-through

Euro area countries share the same money market and the same yield curve. However, national banking sectors continue to be segmented, and there is evidence of a differential

3 Concerning the response of investment to the real cost of capital, opinions differ markedly. For instance, Taylor (1995) claims that there is substantial evidence of the sensitivity of investments to the real interest rate, while Bernanke and Gertler (1995) assert than the most common finding in empirical studies is that "non-neoclassical factors, for instance 'accelerator' variables such as lagged output, sales or cash flow - have the greatest impact on spending.".

4 Another view emphasises the supply–side impact of monetary policy through the a so-called 'cost-channel' of transmission, see e.g. Barth III and Ramey (2000). The cost channel treats increases in nominal interest rates as increases in production costs for firms. Hence, a shock to monetary policy could be viewed as shifting both the aggregate supply and demand curves in the same direction, leading to a large change in output accompanied by small changes in prices.

pass-trough from market interest rates to bank lending rates. E. g., Mojon (2000) reports that the response of short-term credit rates to money market rates is significantly smaller in Italy, Germany and Spain, than in Belgium, France and the Netherlands (Table 2). Taking into account also estimates from previous studies, the pass-through to bank lending rates appears more complete in Belgium, the Netherlands, Sweden and the UK. Signalling the peculiarity of the mortgage market, the response of mortgage rates is generally much weaker than that of other credit rates (almost zero in Spain).

In terms of their impact on the real economy, however, it would seem that these differences in the behaviour of short-term bank lending rates should not be overemphasised. A first consideration in this direction is that spending decisions on investment, housing and durable goods are probably more affected by the level of long-term interest rates than by that of short-term interest rates. A standard result from the literature on interest rate pass-through is that long-term rates respond much more sluggishly than short-term ones to changes in policy rates. Secondly, in the euro area one might expect a convergence towards a fuller and more homogenous pass-through from policy to bank lending rates. This is because all countries share a same – on average less volatile - money market rate, and it has been shown that the pass-through from policy to bank lending rates is inversely related to the volatility of the money market rate (Mojon, 2000). Thirdly, the growing competition between bank loans and debt securities on the asset side (witness the surge in corporate bond issuance in the euro area in 1999-2000) and between banks and money market mutual funds on the liability side, is reducing banks' margins for smoothing interest rates on loans and deposits. In addition, direct state ownership of credit institutions is decreasing, and EU competition policy has started tackling government subsidies to the banking sector. For these reasons, bank lending rates are expected to react more quickly to market interest rates even in those countries where banks have traditionally cushioned the impact of changes in interest rates on their customers' borrowing costs. Finally, as the trend towards disintermediation proceeds, European companies will be increasingly confronted with a more similar but also a more rapid pass-through of changes in the macroeconomic environment to their funding costs. Compared with loan markets where there is often a direct relationship between borrowers and lenders, in 'impersonal' securities markets interest rates typically adjust much faster.

2.2 Structure of production

Production sectors that face an interest-sensitive demand curve – e.g. construction and durable goods - are likely to experience a relatively larger fall in output following a monetary restriction. Similarly, capital-intensive sectors would be expected to suffer comparatively more from an increase in the cost of capital, and be forced to scale down investment plans and eventually output. Recent empirical studies have confirmed these conjectures[5]. For instance, Dedola and Lippi (2001), who examine the output response of 21 industrial sectors in 5 OECD countries, find that heavy industries like machinery and transport equipment respond to a greater degree to monetary policy than other industries. Besides the significant cross-industry heterogeneity of policy effects, these authors also find a similar ranking of industries across countries.

Table 2 reports the employment distribution by macro-sectors. Despite some differences, e.g. a larger manufacturing sector in Germany and Italy and a larger construction sector in Spain, at this level of aggregation the composition of output appears rather similar across countries. However, Dedola and Lippi's (2001) data on the manufacturing sectors of the four big EU countries shows that Germany is relatively more specialised in durable goods production than Italy, France or the UK. Levels of investment are generally higher in the six euro area countries (between 19% and 23% of GDP on average in 1991-2000), than in Sweden or the UK (16-17% of GDP).

All in all, these figures suggest a relatively greater sensitivity of industrial output to monetary policy in Germany and Italy. Looking ahead, there are no clear theoretical or empirical indications to predict a particular direction of change in the structure of output in the euro area (Buti and Sapir, 2001). Krugman (1991 and 1993) has argued that the combination of the Single Market and EMU would increase regional specialisation in Europe, thereby raising the vulnerability to asymmetric disturbances. Other studies, however, have concluded that greater regional specialisation is not a compelling development (European Commission, 1996a). Moreover, even if higher regional concentration occurs, it would not necessarily imply higher national specialisation. For instance, Fatàs (1997, p. 749) notes that "in the post-EMS period, northern Italian regions display higher correlation with German regions than with southern

5 Ganley and Salmon (1997), Hayo and Uhlenbrock (1999), Dedola and Lippi (2001), and Peersman and Smets (2001).

Italian regions". In any event, variations in the composition of output would occur only progressively over time.

2.3 Price and wage flexibility

In all theories of monetary transmission, the real effect of money rests on some form of imperfect price adjustment, suggesting that differences in the degree of price rigidity are another potential cause of asymmetric output responses. As labour market frictions are a key determinant of wage and price flexibility, it is useful to compare national labour market institutions.

Table 2 reports a summary indicator of the strictness of employment protection legislation (EPL) compiled by the OECD. The EPL indicator is a weighted average of indicators on regular labour contracts, temporary contracts, and collective dismissal. The level has no direct economic meaning, but the ranking (amongst 26 OECD countries) is informative. The indicator evidences the relatively lower degree of employment protection in the United Kingdom, and it suggests that conditions in the other seven countries considered are fairly similar (although the Netherlands and Belgium have somewhat less stringent rules than the other countries).

The introduction of the euro, which at least for some countries represents a shift to a low inflation regime, could lead to an increase in nominal rigidity, by favouring longer periods between adjusting prices and larger wage contracts (Calmfors, 1998). On the other hand, the completion of the EU single market, including the elimination of national currencies, might bring about more real flexibility, hence diminishing the real effects of aggregate demand fluctuations (Burda, 1999).

Indeed, progress towards a fully integrated Single Market implies a reduction in the monopolistic power in national goods and services markets (although big players at European level may emerge in some sectors with significant economies of scale), leading to a higher demand elasticity for products, which in turn will translate into a higher elasticity of labour demand. In addition, more cross-border mergers open up the scope for substitution with cheaper labour and capital within the euro area. Both mechanisms tend to lower the ability of national trade unions' to monopolise the supply of labour. Furthermore, by eliminating national monetary and exchange rate policy and restricting the room for manoeuvre for fiscal

policy, the euro policy framework provides incentive for national trade unions to fully internalise the direct link between wages and unemployment.

These considerations do not necessarily suggest that the euro will lead to a convergence of national labour market structures. Current labour market institutions reflect national preferences, which also define the scope and speed of labour market reform. Although the euro represents an element of convergence as far as the formation of inflation expectations is concerned, labour markets represent an area where there is a concrete risk of increasing divergence. The better recent employment performance of countries which reformed their labour market earlier and more deeply - like Denmark, Ireland, the Netherlands and the UK - is suggestive of how labour markets can diverge despite increasing economic integration.

2.4 Income and wealth effects: household sector balance sheets and national housing markets

Income effect

With the exception of Belgium and Italy, in all countries considered the household sector had negative net interest-bearing assets in 1998 (Table 2). Looking at net debt positions is however not enough. To the extent that debtors have a higher propensity to consume than creditors, the amount of gross liabilities of households is also (and possibly more) relevant. Households debt was largest in the Netherlands (154% of disposable income), and above 100% of disposable income also in Germany and the UK. It was considerably smaller in Italy (37% of disposable income) than in any other country.

The maturity of debt is also important. An interest rate hike reduces a household's disposable income (and discounted wealth) more if its liabilities are linked to short-term interest rates, or otherwise adjusted to quickly reflect changes in short-term interest rates, than if the interest rate was fixed for the maturity of the contract. In continental EU countries, households liabilities are constituted almost completely by mortgages, as the consumer credit market is generally small. In France and Italy, interest rates in most mortgage contracts are entirely fixed or pre-set for periods of several years (Table 2), protecting borrowers against unforeseen interest rate rises. Conversely, in the UK, Sweden and Spain mortgage interest payments appear to be mostly linked either to short-term market interest rate or to bank prime

rates, which behave very much like short-term market rates. In Belgium, Germany, the Netherlands, renegotiable rate mortgages are widespread[6].

All in all, these data point to a comparatively stronger (negative) income effect in the UK and Sweden. As for the euro area, Mojon (2000), after having weighed the various items in household and firms balance-sheets on the basis of the interest rate pass-through and prevailing interest rate linkages, concludes that the income effect in Germany, Spain, France and Italy should be similar.

Moreover, the euro monetary policy framework is contributing to reduce any existing asymmetries. First, the development and integration of European financial markets is loosening liquidity constraints, leading to a rapid expansion of private sector credit also in those countries where the credit market was relatively less developed. Secondly, the share of variable versus fixed rate borrowing is an endogenous characteristic of an economic system, which depends, *inter alia*, on the past evolution of inflation and on the credibility of the monetary policy regime (Britton and Whitley, 1997; Arnold and De Vries, 1999). It is no coincidence that variable rate financing is more widespread in countries – such as Italy and the UK – with a history of high and variable inflation. The shift to a credibly low inflation environment is rapidly modifying the maturity structure of public and private borrowing. For instance, in Italy, the maturity of government debt, a sizeable part of households interest-bearing assets, has increased from 3 to 4.5 years between 1992 and 2000. On the liability side, the share of long-term fixed interest rate mortgages has grown from around 25% in 1993 to around 60% in 1995. Thirdly, the integration of European financial markets creates new opportunities of financing for banks, including the possibility to expand securitisation of their assets and to have more extensive recourse to long-term financing. This also increases the scope for lengthening the maturity of bank loans.

Wealth effect

In 1998 real assets (mainly real estate) accounted for around half of total net wealth in France, Italy and the UK, and for almost three quarters in Germany (Table 2). The size of net financial wealth of households differed much across countries. Net financial wealth was

6 Almost all EU countries allow partial deductibility of interest payments from the taxable income of individuals. This slightly reduces the negative impact of a rise in interest rates on disposable income. Moreover, as for a given borrower income an increase in interest rates implies a greater default risk for the lender, some countries impose limits to the maximum payment increase.

largest in the Netherlands (above four times disposable income), Belgium and the UK (3.4-3.7 times disposable income). It was close to 2.5 times disposable income in Italy and France, and between 1.6-2 times disposable income in Germany, Spain and Sweden. A key distinction between real and financial asset prices is that the latter exhibit a high correlation at international level, which effectively poses a limit on the ability of domestic monetary policy to influence domestic financial asset prices.

In terms of the composition of financial wealth, it may be noted that a large portion of households financial assets in the UK and the Netherlands was made up of equity held either directly or through institutional investors (mostly insurance companies and pension funds). Total equity ownership is less widespread in the other six countries considered, partly as a result of underdeveloped private pension schemes. German households hold less equity, either directly or through mutual funds, than in the other countries (63% in 1998, compared to, respectively, 107% and 131% in Italy and France). Households equity holdings were largest in Belgium (173% of disposable income) and Spain (145%).

UK households appear the most exposed to potentially large shifts in their wealth. This is due to the relative composition of their financial wealth and to the historically higher volatility of real estate prices in the UK (see below). Empirical studies have detected a statistically significant wealth effect on consumption from changes in share prices in the UK, the Netherlands, and, somewhat surprisingly, in Germany, although much smaller than in the US. These studies have not found a significant effect in France and Italy (IMF, 2000).

The situation is changing rapidly, however, as in recent years there has been a clear trend towards an increasing weight of equity in total households assets in most European countries. Although the data are inflated by the strong rise in equity prices, the change in wealth composition is to a large extent attributable to a portfolio reallocation stimulated by the fall in bond yields and the spreading of mutual funds and private pension schemes.

Housing markets

Because of its important macroeconomic role, the housing market has attracted special attention in recent research[7]. As real estate typically becomes the largest component of household wealth, variations in house prices may have a large impact on households'

[7] See, e.g. Lea *et al.* (1997), Maclennan *et al*. (1998), Iacoviello (2000), IMF (2000).

perception of their wealth and permanent income as well as on their borrowing possibilities. In debt-financed home purchases, the disposable income of households is exposed to changes in interest rates, unless the mortgage contract is at a long-term fixed rate. Furthermore, real-estate collateral plays an important role in household credit and in company credit in Europe and there is some evidence of investment sensitivity to property prices (IMF, 2000).

Maclennan *et al*. (1998) relate cross-country variation in the degree of volatility of house prices to differences in housing and financial market institutions. In countries with high transaction costs, low loan-to-value ratios, a small owner-occupied sector, a large proportion of fixed-interest mortgages and a large tenure proportion in the private rented sector, real house prices should experience relatively lower volatility. Where mortgage markets have been liberalised already in the 1980s, as in the UK, Sweden and Finland, real house prices have been more volatile, with the standard deviation of annual percentage changes ranging between 7 and 15 percentage points, compared to around 2 percentage points in Belgium and Germany and 7-8 percentage points in France and Italy.

Because of its housing market institutions, the UK is therefore most likely to experience larger monetary policy effects on demand through the housing market than the other EU countries. Sweden displays many characteristics similar to the UK, whereas France, Germany (where home ownership is less widespread) and, especially, Italy, would in many respects be close to the other end of the spectrum.

Although the euro is fostering stronger competition in mortgage credit, convergence in housing market institutions across countries cannot be predicted: housing markets are shaped by all sorts of direct of indirect state intervention – also reflecting varying social preferences - and are not subject to cross-border arbitrage.

2.5 Exchange rate channel

Changes in the euro exchange rate affect euro area countries asymmetrically on at least two counts. First, an appreciation of the euro will have a stronger impact on economic activity in those Member States which export relatively more goods and services to third countries. Second, euro area Member States in which imports from outside the euro area make up a larger share of the economy will see a larger impact on the domestic price level, and a larger

opposite impact on domestic real incomes. The latter mechanism tends to pull demand and output in the opposite direction of the change in exports.

Exports to third countries are proportionally larger in the small open economies of the euro area. They are around 30% of GDP in Belgium and 22% in the Netherlands (Table 2)[8]. Amongst the large euro area countries, Germany stands out for its higher share of extra-euro area exports, 17% of GDP, compared to 13-14% in France, Italy and the UK and 11% in Spain. The corresponding figures for Sweden and the UK are 27% and 13%, respectively. These figure would indicate that smaller countries, and Germany amongst the large ones are relatively more exposed to exchange rate movements.

It should be noted, however, that because of the total direct and indirect import content in the production of exports the actual exposure to extra-euro area exports is generally smaller than indicated by the export-to-GDP ratios. Moreover, because the import content of consumption is also generally higher in more open economies, these will experience a larger terms of trade effect than less open economies. As this effect goes in the opposite direction than the change in net exports, (i.e. it boosts real purchasing power when the exchange rate appreciates and it reduces it when the exchange rate depreciates), it also tends to decrease differences in the overall net impact of the exchange rate channel.

3. Credit channel

The 'credit view' emphasises the role of credit market imperfections such as asymmetric information and costly enforcement of contracts, which strengthen the impact of a monetary tightening on the cost and availability of credit. The higher cost and the lower supply of credit induce a fall in inventories and capital equipment spending by firms, and in housing and durable goods purchases by households. A distinction is usually made between a 'bank lending' channel and a 'balance-sheet' (or 'net worth') channel (Bernanke and Gertler, 1995).

The *bank lending* channel emphasises the special role of banks in dealing with asymmetric information. There are two conditions for the bank lending channel to work. First, a monetary

8 No data are available for intra- and extra-EMU trade in services per Member State. The estimates in Table 2 assume that extra-EMU exports make up the same share of services exports as they do for goods. This assumption is consistent with data on extra- and intra-EU trade in services published by Eurostat.

policy tightening, by reducing bank reserves and deposits, must limit banks' ability to supply loans. This is not the case when banks can adjust their balance sheets, for instance by selling securities, or can obtain loanable funds by issuing instruments not subject to reserve requirements, e.g. certificates of deposit or bonds. Secondly, at least for some borrowers, bank credit and other debt instruments must not be perfect substitutes, so that a fall in the supply of bank loans implies a reduced availability of credit. This is typically the case for small firms and individuals.

In the *balance-sheet* (or net-worth) channel the impact of an interest rate hike is magnified by the financing difficulties originating in the balance-sheets of firms and households. Higher interest rates lower the cash flow and the net worth of firms, reducing their collateral base and their creditworthiness. As a result, their cost of borrowing (whether or not from banks) rise, not only because of the higher level of interest rates but also because of a larger external finance premium (the cost wedge between internal and external finance). Adverse selection and moral hazard problems are exacerbated by the worse financial position of borrowers and may lead lenders to reduce the supply of credit[9]. The remainder of this section examines the factors which are likely to determine the significance of the credit channel.

Loan supply

Domestic banking sectors differ greatly in terms of concentration, profitability and financial strength (Table 3). Banks in the UK, the Netherlands, Belgium and Sweden are more profitable and stronger financially than in the other countries. Italy and France have the weakest banking sectors. Despite these differences, it seems likely that in all the countries considered the banking system holds assets other than loans that it can use to buffer any shortfall in deposits following a monetary contraction. Possibly as a result of the availability of such buffers, the practical relevance of the bank lending channel has remained contentious[10]. In addition, EU banks can obtain loanable funds either on the interbank market

9 As stressed by Peersman and Smets (2001), these effects are likely to be stronger in arecession than in a boom.

10 Giavazzi *et al*. (1999) do not find evidence of a significant response of bank loans to the monetary tightening which occurred during 1992. Their analysis covers Germany, Spain, France and Italy. A typical result from studies of the bank lending channel is that following a monetary tightening the supply of bank loans to small firms and households decreases, whereas that to larger companies increases (e.g. Watson, 1999, for Spain; Saidenberg and Straham, 1999, for the US). This suggests that what counts is not so much whether loans come originally from banks or are raised directly from the markets but rather the size distribution of firms and other characteristics – e.g. weak legal and regulatory framework and contract enforcement - which reinforce the extent and the risk attached to asymmetric information between

or by issuing securities. The ongoing consolidation in the EU banking sector and progress in financial market integration are further expanding these possibilities.

Bank dependence

In continental Europe, bank loans account for the bulk of non-equity liabilities of non-financial companies, whereas they are around 50% of liabilities in the UK. Equity finance is most developed in the UK but it is growing in the rest of Europe (Table 3). Differences exist in the extent to which non-financial companies finance themselves directly on the securities market. In 1998, the outstanding amount of non-financial corporate securities accounted for just 1% of GDP in Italy and Germany, as compared to 6-8% of GDP in France, Sweden and the UK.

Firm size

Empirical results corroborate the presumption that, following an interest rate hike, small firms retrench activity by more than large firms and that they suffer from a fall in bank lending (Dedola and Lippi, 2001; Guiso *et al.*, 1999; Saidenberg and Straham, 1999; Watson, 1999). Table 3 reports the share of employment in firms with more than 250 employees. In Italy and Spain small firms account for as much as 80% of employment. At the opposite end, the corresponding figure for the UK, Germany, the Netherlands and Sweden is around 60%.

Collateral

Cross-country data on collateral is hard to come by. Table 3 reports data gathered by the BIS (1995), which refer to 1993. Real estate collateral was more widespread in the UK and Sweden, whereas collateral use was broadly similar in the other six countries. The information on the typical loan-to-value ratio for mortgages in Table 2 can be used to supplement these data. While in the UK the typical loan-to-value ratio in 1995 was close to 100%, it was only 40% in Italy. In the other countries, it was in the 70-80% range.

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borrowers and lenders. Hence, these results seem more consistent with broader balance sheet effects, related to a reduced creditworthiness of small borrowers and a diminished availability of collateral, than with a constrained supply of bank loans as postulated by the bank lending channel.

Leverage

Table 3 shows, for each country, the average leverage ratio and the leverage ratio of the median firm. In terms of its influence on monetary transmission, however, the leverage ratio can be interpreted in two contradictory ways. On one hand, it can be seen as an indicator of firms' borrowing capacity, hence suggesting that a higher ratio would be associated with a weaker credit effect. On the other hand, it can be considered as a proxy for the interest burden, in which case a higher ratio would be associated with stronger cash-flow and net worth effects. Leverage was lowest in France and highest in the UK, with the other countries having similar ratios.

Legal framework

A weak legal framework – i.e. one which gives little protection to shareholders and creditors, no fully transparent company accounting rules and weak contract enforcement - sharpens the moral hazard and adverse selection problems by increasing the loss value associated to any given level of default risk. Indeed, the relative effectiveness and efficiency of national legal systems is considered an important explanatory factor of the present configuration of economic and financial structures (Cecchetti, 1999; La Porta *et al*., 1997). For instance, the level of outstanding mortgage debt seems to be related to the rules for foreclosure and repossession of collateral (Lea *et al*., 1997).

On the basis of the indicators in Table 3, Italy appears to have a relatively weaker legal system, as a result of weak enforcement of contracts and shareholder rights. The UK grants the highest protection to shareholders and creditors, but the degree of enforcement is below that of some other countries. Sweden and the Netherlands also appear to have relatively well-functioning legal systems.

Summing up on the credit channel

It is not obvious to draw conclusions on the credit channel. While a more developed financial system offers lower funding costs and a broader range of financing sources, at the same time the easier access to credit increases the reliance of economic agents on borrowed funds and their exposure to changes in cash-flows and creditworthiness. Hence, the balance-sheet channel might be relatively strong in Italy and Spain, because of the large number of small companies and the comparatively weaker legal system, but also in the UK (and Sweden)

because of the substantially larger amount of outstanding credit to households and firms and the extensive use of collateral.

This is a different view from that of studies which have focussed on the bank lending channel (e.g., Kashyap and Stein, 1997). These studies tend to conclude that the impact of monetary policy would be stronger in continental EU countries than in the UK, essentially as a result of the role of bank credit and the size structure of firms. However, the evidence on the relevance of the bank lending channel is weak, as even those empirical studies which ascertain the existence of such channel in either Europe or the US do not go as far as proving that it is quantitatively significant.

4. Concluding remarks

The previous sections have shown that EU countries display large differences in economic and financial structures, with the potential to induce heterogeneous output and inflation responses to monetary policy. However, whether looked at from a particular perspective or in more general terms, the differences across the six euro area countries considered (Belgium, Germany, Spain, France, Italy, the Netherlands) are of a lesser scale than those between them and the UK or Sweden. While in itself this does not lead to a conclusion on the overall power of monetary policy in the two groups of countries it suggests that the mechanisms at work may be different.

Beyond providing a snapshot of the present situation, this study has attempted to distinguish between those areas where one can expect national structures to convergence over time, hence reducing the potential for asymmetries in monetary transmission, and areas in which structural differences are likely to persist.

The biggest changes are undoubtedly taking place in financial structures, under the combined effect of the single monetary policy regime and of the wider forces of globalisation and technological change. These changes are blurring the traditional contrast between an Anglo-Saxon ‘market-based’ financial system and a continental Europe ‘bank-centred’ financial system. The degree of approximation of financial structures, however, will be constrained by three obstacles: the varying effectiveness and efficiency of national legal systems; the

difference in the institutions governing the housing markets; the different national choices made, with regard to the funding of the pension system and the role of pension funds.

With the euro, asymmetries originating from the external side are by definition reduced (but not eliminated), as for all participating countries any given monetary policy shock will be associated with a smaller response of the effective exchange rate. As for economic structures, while the single market and the euro are bringing about changes in the pricing behaviour of companies and in the behaviour of social partners, there seems to be little ground to foresee that these changes will reduce the existing cross-country differentiation in production structures, labour market institutions and firm size.

All in all, although the cross-country heterogeneity in the effects of monetary policy could reduce over time as financial structures become more similar and economic agents adjust their behaviour to the new policy environment, it will remain to some extent a persistent feature of the euro area, as in any other large monetary union. In practical terms, however, it is probable that asymmetries in transmission will be a lesser concern, at least in the present configuration of the euro area, than the issues raised by having the same nominal interest rates in countries that are at different phases of the business cycle. Because of the unique allocation of policy instruments in the euro area, however, developments in national transmission mechanisms will need to be more carefully monitored by policy makers.

For the single monetary policy, an interesting development relates to how the various trends highlighted above are changing the relative weight of the various channels of transmission. The interest rate channel is becoming more effective under the combined effect of: a quicker pass-through from policy to market and retail interest rates, resulting from the single monetary policy and money and capital market integration; growing disintermediation, which exposes debtors to the more rapid and more pronounced response of market finance than bank lending to changes in official interest rates; and, stronger competition in the supply of bank loans. The role of transmission through asset prices is also growing, as the ongoing redistribution of households wealth from real assets towards financial assets, and in particular towards equities, strengthens the wealth effect. Most of euro area trade being conducted within the area, the exchange rate channel has smaller relevance than for any individual Member State. As for the credit channel, with credit constraints being loosened as financial market integration proceeds, the exposure of companies and individuals to debt is rapidly growing and it may become a source of increased vulnerability to interest rate increases.

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Table 2 (first part): Interest rate and trade channels

	Year	B	D	E	F	I	NL	S	UK	Source
Response of bank lending rates to a 100 basis points change in the money market rate										
- short-term loan rate - response after 3 months	1988-98	0.96	0.68	0.65	0.86	0.50	0.99			Mojon (2000) [a]
- mortgage interest rate - response after 3 months	"	0.26	0.45	0.07	0.34		0.27			"
- deposit interest rate - response after 3 months	"	0.94	0.66	0.10		0.10	0.41			"
- short-term loan rate - response after 3 months	1984-94	0.99	0.45	0.30	0.45	0.69	0.96	0.74	1.01	Borio and Fritz (1995) [a]
- short-term loan rate - long-run response	"	1.27	1.05	1.17	0.74	1.22	1.08	0.92	1.01	"
- short-term loan rate - response after 3 months	ca. 1990-94	0.95	0.36	1.00	0.53	0.72	0.95		1.00	"
- short-term loan rate - long-run response	"	0.93	0.98	1.05	0.59	1.07	1.03		1.00	"
Production										
Sectoral employment (% of total employment)										
- agriculture	1996	0.7	1.4	3.4	1.7	3.7	1.7	1.4	1.2	EU Commission, AMECO database
- industry excl building and construction	"	22.0	25.1	22.1	19.2	27.2	17.1	20.0	19.1	"
- building and construction	"	5.8	8.2	9.6	5.8	5.6	6.2	4.9	4.0	"
- services	"	71.5	65.2	64.9	73.3	63.6	75.0	73.8	75.7	"
% of durable goods in total industrial production	avg. 1970-93		57.7		48.2	50.6			46.0	Dedola and Lippi (2001)
Total investment (% of GDP)	avg. 1991-2000	20.8	22.4	22.9	19.3	19.0	21.3	16.5	16.9	EU Commission, AMECO database
Labour market										
Employment protection legislation (a higher figure indicates higher protection)	end-1990s	2.1	2.5	3.1	3.0	3.3	2.1	2.2	0.5	OECD (1999)
(rank in OECD)	"	*13*	*18*	*22*	*21*	*23*	*14*	*16*	*2*	"

Table 2 (second part): Interest rate and trade channels										
	Year	**B**	**D**	**E**	**F**	**I**	**NL**	**S**	**UK**	**Source**
Households balance-sheet (% of disposable income)										
Real assets	1998	N/A	429	N/A	271	238 (1996)	N/A	N/A	326	OECD (2000)
Financial assets, including equities	"	436	271	285	320	295	568	260	447	Eurostat [b]
- equity (incl. shares of mutual funds)	"	173	63	145	131	107	120	84	89	"
- interest bearing assets	"	101	30	5	8	68	14	16	7	"
- insurances and technical reserves	"	45	72	30	73	33	307	79	242	"
Financial liabilities	"	63	112	78	66	37	154	93	106	"
- short-term debt	"	5	9	5	4		11			"
- long-term debt	"	53	102	55	52		143			"
Net financial wealth	"	372	159	207	253	259	414	166	341	"
Net interest-bearing assets	"	43	-82	-55	-49	40	-140	-76	-90	"
Memo: households disposable income as % of GDP	"	72	63	66	64	70	51	51	67	"
Housing										
Tenure: owner occupied houses	1995	66	41	78	54	67	47	43	67	Mylonas et al.(2000) [c]
Outstanding residential mortgage debt as % of GDP	1998	25	53	24	21	8	65	50	57	IMF (2000)
Outstanding residential mortgage debt as % of GDP	1995	22	51	22	21	7	60	51	57	Maclennan et al (1998)
- % of debt at fixed interest rate	1995	25	20	20	80	60	25	little	0	Lea et al. (1997)
- % of debt at renegotiable (more than 1 year) interest rate	"	75	40	0	0	0	65		30	"
- % of debt at variable or reviewable (at lender's discretion) interest rate	"	0	40	80	20	40	10	most	70	"
Typical term	"	15-20	25-30	15-20	15-20	15	30	20-30	25	"
Typical loan-to-value ratio	"	80	60-80	70-80	70-80	40	75	70-75	90-95	"
Trade (% of GDP)										
Total exports of goods and services	1999	76	29	28	26	26	61	44	26	EU Commission
Extra euro area exports of goods and services	"	30	17	11	13	14	22	27	13	EU Commission (estimates)
Total imports of goods and services	"	72	28	28	24	23	56	38	27	EU Commission
Extra euro area imports of goods and services	"	30	15	12	12	11	32	19	15	EU Commission (estimates)
Notes:										
(a) The interest rate series are not strictly comparable across countries.										
(b) For financial accounts. OECD for household disposable income.										
(c) For Spain: Maclennan et al. (1998)										

Table 3: Credit channel

	Year	B	D	E	F	I	NL	S	UK	Source
Credit market (% of GDP)										
Bank credit to the non-bank private sector	1998	77	118	88 (1997)	80	60	107	103 (1995)	120	Mylonas et al. (2000) [a]
Private sector domestic debt securities	"	46	53	8 (1997)	33	31	11	50	28	"
- Financial institutions	"	34	53	5 (1997)	27	30	8	43	19	"
- Corporate issuers	"	12	1/2	3 (1997)	6	1	3	7	8	"
Equity market capitalisation (% of GDP)	1998	93	48	51 (1997)	65	46	146	121	169	"
Banking sector										
Concentration (share of assets of top 5 banks)	1997	57	17	44	40	25	80	90	28	ECB (1999)
Number of banks	1997	134	3578	416	1299	935	90	242	551	"
ROE (net income as % of equity)	1996	15.3	12.3	9.7	4.8	5.1	17.6	24.0	25.6	"
Financial strength rating, average (number of rated banks in brackets)	1997	B (7)	C+ (29)	B (12)	C (27)	C (21)	B+ (7)	C-C+ (5)	C+ (30)	IMF (1997) [b]
Collateral										
% of total loans to non-bank private sector backed by real estate collateral	1993	34	36	33	41	40	36	>61	59	BIS (1995)
Firm leverage										
total debt/(total debt plus net capital) - average	1996	51.4	52.0	53.5	46.3	52.3	43.9		63.1	Guiso et al. (1999)
total debt/(total debt plus net capital) - median firm	"	58.4	61.0	56.4	49.1	62.5	63.7		60.5	"
Size structure of firms										
% of total employment in firms with > than 250 employees	1994/95	27.4	42.3	20.5	34.1	20.1	39.4	39.0	43.1	EU Commission (1996b)
Legal framework										
Shareholder rights (a higher figure indicates more rights)		0	1	2	2	0	2	2	4	La Porta et al. (1997)
Creditor rights (a higher figure indicates more rights)		2	3	2	0	2	2	2	4	"
Enforcement (a higher figure indicates stricter enforcement)		10.00	9.23	7.80	8.98	8.33	10.00	10.00	8.57	"

Notes:
(a) ECB (1999) for Spain.
(b) The rating is Moody's Investors Service assessment of whether a bank is likely to require financial support from shareholders, the government, or other institutions.
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